CLAIMS:

1. A conductive integrated circuit metal-alloy interconnection comprising an alloy of copper and silver, with silver being present in the alloy at from less than 1.0 at% to 0.001 at%.

2. The interconnection of claim 1 wherein silver is present in the alloy at from 0.005 at% to 0.1 at%.

3. The interconnection of claim 1 having higher electromigration resistance than copper of a purity of greater than 99.999% of the same grain size.

4. The interconnection of claim 1 having greater thermal stability to grain size retention and crystal orientation retention than copper of a purity of greater than 99.999% of the same grain size.

5. A physical vapor deposition target comprising an alloy of copper and silver, with silver being present in the alloy at from less than 1.0 at% to 0.001 at%.

6. The physical vapor deposition target of claim 5 wherein silver is present in the alloy at from 0.005 at% to 0.1 at%.

7. The physical vapor deposition target of claim 5 comprising an RF sputtering coil.

8. An electroplating anode comprising an alloy of copper and silver, with silver being present in the alloy at from less than 1.0 at% to 0.001 at%.

9. The electroplating anode of claim 8 wherein silver is present in the alloy at from 0.005 at% to 0.1 at%.

10. A metal alloy for use as a conductive interconnection in an integrated circuit comprising copper and silver, with silver being present in the alloy at from less than 1.0 at% to 0.001 at%.

11. The metal alloy of claim 10 wherein silver is present in the alloy at from 0.005 at% to 0.1 at%.

12. A conductive integrated circuit metal alloy interconnection comprising an alloy of copper and silver, with silver being present in the alloy at from 50 at% to 70 at%.

13. The interconnection of claim 12 wherein silver is present in the alloy at from 55 at% to 65 at%.

14. The interconnection of claim 12 wherein silver is present in the alloy at about 60 at%.

15. The interconnection of claim 12 having higher electromigration resistance than copper of a purity of greater than 99.999% of the same grain size.

16. The interconnection of claim 12 having greater thermal stability to grain size retention and crystal orientation retention than copper of a purity of greater than 99.999% of the same grain size.

17. A physical vapor deposition target comprising an alloy of copper and silver, with silver being present in the alloy at from 50 at% to 70 at%.

18. The physical vapor deposition target of claim 17 wherein silver is present in the alloy at from 55 at% to 65 at%.

19. The physical vapor deposition target of claim 17 wherein silver is present in the alloy at about 60 at%.

20. The physical vapor deposition target of claim 17 comprising an RF sputtering coil.

21. An electroplating anode comprising an alloy of copper and silver, with silver being present in the alloy at from 50 at% to 70 at%.

22. The electroplating anode of claim 21 wherein silver is present in the alloy at from 55 at% to 65 at%.

23. The electroplating anode of claim 21 wherein silver is present in the alloy at about 60 at%.

24. A metal alloy for use as a conductive interconnection in an integrated circuit comprising copper and silver, with silver being present in the alloy at from 50 at% to 70 at%.

25. The metal alloy of claim 24 wherein silver is present in the alloy at from 55 at% to 65 at%.

26. A conductive integrated circuit metal alloy interconnection comprising an alloy of copper and tin, with tin being present in the alloy at from less than 1.0 at% to 0.001 at%.

27. The interconnection of claim 26 wherein tin is present in the alloy at from 0.01 at% to 0.1 at%.

28. The interconnection of claim 26 having higher electromigration resistance than copper of a purity of greater than 99.999% of the same grain size.

29. The interconnection of claim 26 having greater thermal stability to grain size retention and crystal orientation retention than copper of a purity of greater than 99.999% of the same grain size.

30. The interconnection of claim 26 having an electrical resistivity of less than 1.8 microohms.cm.

31. A physical vapor deposition target comprising an alloy of copper and tin, with tin being present in the alloy at from less than 1.0 at% to 0.001 at%.

32. The physical vapor deposition target of claim 31 wherein tin is present in the alloy at from 0.01 at% to 0.1 at%.

33. The physical vapor deposition target of claim 31 comprising an RF sputtering coil.

34. An electroplating anode comprising an alloy of copper and tin, with tin being present in the alloy at from less than 1.0 at% to 0.001 at%.

35. The electroplating anode of claim 34 wherein tin is present in the alloy at from 0.01 at% to 0.1 at%.

36. A metal alloy for use as a conductive interconnection in an integrated circuit comprising copper and tin, with tin being present in the alloy at from less than 1.0 at% to 0.001 at%.

37. The metal alloy of claim 36 wherein tin is present in the alloy at from 0.01 at% to 0.1 at%.

38. A conductive integrated circuit metal alloy interconnection comprising an alloy of copper and one or more other elements, the one or more other elements being present in the alloy at a total concentration from less than 1.0 at% to 0.001 at% and being selected from the group consisting of Be, Ca, Sr, Ba, Sc, Y, La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, Ti, Zr, Hf, Zn, Cd, B, Ga, In, C, Se, and Te.

39. The interconnection of claim 38 wherein the one or more other elements are present in the alloy at a total concentration from 0.005 at% to 0.1 at%.

40. The interconnection of claim 38 having higher electromigration resistance than copper of a purity of greater than 99.999% of the same grain size.

41. The interconnection of claim 38 having greater thermal stability to grain size retention and crystal orientation retention than copper of a purity of greater than 99.999% of the same grain size.

42. A physical vapor deposition target comprising an alloy of copper and one or more other elements, the one or more other elements being present in the alloy at a total concentration from less than 1.0 at% to 0.001 at% and being selected from the group consisting of Be, Ca, Sr, Ba, Sc, Y, La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, Ti, Zr, Hf, Zn, Cd, B, Ga, In, C, Se, and Te.

43. The physical vapor deposition target of claim 42 wherein the one or more other elements are present in the alloy at a total concentration at from 0.005 at% to 0.1 at%.

44. The physical vapor deposition target of claim 42 comprising an RF sputtering coil.

45. An electroplating anode comprising an alloy of copper and one or more other elements, the one or more other elements being present in the alloy at a total concentration from less than 1.0 at% to 0.001 at% and being selected from the group consisting of Be, Ca, Sr, Ba, Sc, Y, La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, Ti, Zr, Hf, Zn, Cd, B, Ga, In, C, Se, and Te.

46. The electroplating anode of claim 45 wherein the one or more other elements are present in the alloy at a total concentration at from 0.005 at% to 0.1 at%.

47. A metal alloy for use as a conductive interconnection in an integrated circuit comprising copper and one or more other elements, the one or more other elements being present in the alloy at a total concentration from less than 1.0 at% to 0.001 at% and being selected from the group consisting of Be, Ca, Sr, Ba, Sc, Y, La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, Ti, Zr, Hf, Zn, Cd, B, Ga, In, C, Se, and Te.

48. The metal alloy of claim 47 wherein the one or more other elements are present in the alloy at a total concentration from 0.005 at% to 0.1 at%.

49. A conductive integrated circuit metal alloy interconnection comprising an alloy of copper and one or more other elements, the one or more other elements being present in the alloy at a total concentration from less than 1.0 at% to 0.001 at% and being selected from the group consisting of V, Nb, Ta, Cr, Mo, W, Mn, Tc, Re, Fe, Ru, Os, Co, Rh, Ni, Pd, Pt, Au, Tl, and Pb.

50. The interconnection of claim 49 wherein the one or more other elements are present in the alloy at a total concentration from 0.005 at% to 0.1 at%.

51. The interconnection of claim 49 having higher electromigration resistance than copper of a purity of greater than 99.999% of the same grain size.

52. The interconnection of claim 49 having greater thermal stability to grain size retention and crystal orientation retention than copper of a purity of greater than 99.999% of the same grain size.

53. A physical vapor deposition target comprising an alloy of copper and one or more other elements, the one or more other elements being present in the alloy at a total concentration from less than 1.0 at% to 0.001 at% and being selected from the group consisting of V, Nb, Ta, Cr, Mo, W, Mn, Tc, Re, Fe, Ru, Os, Co, Rh, Ni, Pd, Pt, Au, Tl, and Pb.

54. The physical vapor deposition target of claim 53 wherein the one or more other elements are present in the alloy at a total concentration at from 0.005 at% to 0.1 at%.

55. The physical vapor deposition target of claim 53 comprising an RF sputtering coil.

56. An electroplating anode comprising an alloy of copper and one or more other elements, the one or more other elements being present in the alloy at a total concentration from less than 1.0 at% to 0.001 at% and being selected from the group consisting of V, Nb, Ta, Cr, Mo, W, Mn, Tc, Re, Fe, Ru, Os, Co, Rh, Ni, Pd, Pt, Au, Tl, and Pb.

57. The electroplating anode of claim 56 wherein the one or more other elements are present in the alloy at a total concentration at from 0.005 at% to 0.1 at%.

58. A conductive integrated circuit metal alloy interconnection comprising an alloy of copper and one or more other elements, the one or more other elements being present in the alloy at a total concentration from less than 1.0 at% to 0.001 at% and being selected from the group consisting of V, Nb, Ta, Cr, Mo, W, Mn, Tc, Re, Fe, Ru, Os, Co, Rh, Ni, Pd, Pt, Au, Tl, and Pb.

59. The interconnection of claim 58 wherein the one or more other elements are present in the alloy at a total concentration from 0.005 at% to 0.1 at%.

Add BT